CLAIMS

What is claimed is:

1. A data traffic routerfor use in an integrated circuit (IC) to interface a plurality of subsystems of said IC, the data traffic router comprising:

a first multiplexor coupled to a first, a second and a third subsystem of said IC to select and output for said third subsystem one of a first output of said first subsystem and a second output of said second subsystem;

a second multiplexor coupled to said first, second and third subsystems of said IC to select and output for said second subsystem one of said first output of said first subsystem and a third output of said third subsystem;

a third multiplexor coupled to said first second and third subsystems to select and output for said first subsystem one of said second output of said second subsystem and said third output of said third subsystem; and

a controller coupled to said first, second, and third subsystems and said first, second and third multiplexors to allocate and control operation of said first, second and third multiplexors to facilitate concurrent communications between selected combinations of said first, second and third subsystems.

2. The data traffic router of claim 1, wherein said controller comprises a routing resource configurator coupled to the first, second and third subsystems and said

first, second and third multiplexors to configure said first, second and third multiplexors responsive to destinations of said first, second and third outputs to facilitate said first, second and third subsystems to selectively communicate with one another.

3. The data traffic router of claim 2, wherein said controller further comprises a configuration state storage unit to store and track configuration states of said first, second and third multiplexors, and said routing resource configuration further configures said first, second and third multiplexors for use by said first, second and third subsystems to selectively communicate with one another, based at least on part on said configuration states tracked.

4. The data traffic router of claim 3, wherein said routing resource configurator further notifies a source one of said first, second and third subsystems whenever it is unable to configure a corresponding one of said first, second and third multiplexors to provide a path for an output of said source one of said first, second and third subsystems to reach the output's destination.

5. The data traffic router of claim 4, wherein said routing resource configurator is equipped to notify said source one of said first, second and third subsystems to retry at a later point in time.

6. The data traffic router of claim 2, wherein said configurator further provides said first, second and third multiplexors with appropriate configuration signals to configure said first, second and third multiplexors.

7. The data traffic router of claim 1, wherein

said router further comprises a fourth multiplexor coupled to a fourth subsystem, and said first, second and third subsystems to select for said fourth subsystem one of said first output of said first subsystem, said second output of said second subsystem, and said third output of said third subsystem;

each of said first, second and third multiplexors is further coupled to said fourth system and equipped to potentially select a fourth output of said fourth system in lieu of selecting one of said first and second outputs, one of said first and third outputs, and one of said second and third outputs respectively; and

said controller is also coupled to said fourth subsystem and said fourth multiplexor to control operation of said fourth multiplexor, in addition to said control of said first, second and third multiplexors, to facilitate concurrent communication between selected combinations of said first, second, third and fourth subsystems.

8. The data traffic router of claim 1, wherein said third multiplexor is coupled to said first subsystem via an on-chip bus, and said first subsystem is a grantee subsystem of a fourth plurality of subsystems attached to said on-chip bus.

9. The data traffic router of claim 8, wherein each of said fourth plurality of subsystems is a selected one of a security engine, a voice processor, a collection of peripheral device controllers, a framer processor, and a network media access controller.

10. The data traffic router of claim 1, wherein said first multiplexor is also coupled to receive the third output of said third subsystem to potentially select for itself said third output of said third subsystem in lieu of selecting one of said first and second outputs of said first and second subsystems, to facilitate a first and a second device attached to said third subsystem in communicating with one another.

11. The data traffic router of claim 10, wherein said third subsystem is an external device controller.

12. The data traffic router of claim 1, wherein said second subsystem is a selected ones of a processor and a memory controller.

13. In a data traffic router of an integrated circuit (IC), a method of operation comprising:

detecting a first output from a first subsystem of the IC destined for a selected one of a second and a third subsystem of the IC, requiring at least the use of a corresponding selected one of a first and a second multiplexor of the data traffic

router, the first multiplexor selecting for said second subsystem one of at least said first output of said first subsystem and a second output of said third subsystem, and the second multiplexor selecting for said third subsystem one of at least said first output of said first subsystem and a third output of said second subsystem; and

configuring the corresponding selected one of said first and second multiplexors to provide a path for said first output of said first subsystem to reach the destined one of said second and third subsystems, if the corresponding selected one of said first and second multiplexors is available to be so configured.

14. The method of claim 13, wherein the method further comprises determining if the corresponding selected one of said first and second multiplexors is available to be so configured.

15. The method of claim 13, wherein the method further comprises tracking the configuration state of the corresponding selected one of said first and second multiplexors, upon configuring the corresponding selected one of said first and second multiplexors.

16. The method of claim 13, wherein the method further comprises notifying said first subsystem if the data traffic router is unable to configure the corresponding selected one of said first and second multiplexors to provide a path for said first

output of said first subsystem to reach the destined one of said second and third subsystems.

17. The method of claim 13, wherein the method further comprises

detecting concurrently a second output of said second subsystem destine for a selected one of said first and said third subsystem, requiring at least the use of a corresponding selected one of a third and said second multiplexor of the data traffic router, the third multiplexor selecting for said first subsystem one of at least said third output of said second subsystem and said second output of said third subsystem;

concurrently configuring the corresponding selected one of said third and second multiplexors to provide a path for said second output of said second subsystem to reach the destined one of said first and third subsystems, if the corresponding selected one of said third and second multiplexors is available to be so configured.

18. The method of claim 17, wherein both of said first and second outputs of said first and second subsystems are destined for said third subsystem, and said configuring of said second multiplexor is further based on relative priorities of said first and second outputs.

19. The method of claim 15, wherein the method further comprises

detecting concurrently a third output from said third subsystem to communicate with a selected one of said first and said second subsystem, requiring at least the use of a corresponding selected one of said third and first multiplexor of the data traffic router;

concurrently configuring the corresponding selected one of said third and first multiplexors to provide a path for said third output of said third subsystem to reach the destined one of said first and second subsystems, if the corresponding selected one of said third and first multiplexors is available to be so configured.

20. The method of claim 19, wherein two of said first, second and third outputs from said first, second and third subsystems are destined for the same target subsystem, and said configuring of the multiplexor being contended is further based on relative priorities of the two outputs.

21. An integrated circuit comprising:

a first subsystem;

a second subsystem;

a third subsystem;

a data traffic router coupled to the first, second and third subsystems to facilitate concurrent communications between selected combinations of said first, second and third subsystems, said data traffic router including

a plurality of multiplexors coupled to said first, second and third subsystems to select for said subsystems respectively one each, outputs of the other subsystems, and

a controller coupled to said first, second and third subsystems, and said multiplexors to selectively configure said multiplexors to facilitate said concurrent communication between said selected combinations of said first, second and third subsystems.

22. The integrated circuit of claim 21, wherein said multiplexors of said data traffic router comprises

a first multiplexor coupled to said subsystems to select and output for said third subsystem one of a first output of said first subsystem and a second output of said second subsystem;

a second multiplexor coupled to said subsystems to select and output for said second subsystem one of said first output of said first subsystem and a third output of said third subsystem; and

a third multiplexor coupled to said subsystems to select and output for said first subsystem one of said second output of said second subsystem and said third output of said third subsystem.

23. The integrated circuit of claim 22 wherein said first multiplexor is also coupled to receive the third output of said third subsystem to potentially select for itself said

third output of said third subsystem in lieu of selecting one of said first and second outputs of said first and second subsystems, to facilitate a first and a second device attached to said third subsystem in communicating with one another.

24. The integrated circuit of claim 23, wherein said third subsystem is an external device controller.

25. The integrated circuit of claim 22, wherein

the integrated circuit further comprises a fourth subsystem;

said multiplexors of said data traffic router further comprises a fourth multiplexor coupled to a fourth subsystem, and said first, second and third subsystems to select for said fourth subsystem one of said first output of said first subsystem, said second output of said second subsystem, and said third output of said third subsystem; and

each of said first, second and third multiplexors is further coupled to said fourth system and equipped to potentially select a fourth output of said fourth system in lieu of selecting one of said first and second outputs, one of said first and third outputs, and one of said second and third outputs respectively.

26. The integrated circuit of claim 21, wherein said controller of said data traffic router comprises a routing resource configurator coupled to the first, second and third subsystems and said multiplexors to configure said multiplexors responsive to

destinations of outputs of said subsystems to facilitate said first, second and third subsystems to selectively communicate with one another.

27. The integrated circuit of claim 26, wherein said controller of said data traffic router further comprises a configuration state storage unit to store and track configuration states of said multiplexors, and said routing resource configuration further configures said multiplexors for use by said first, second and third subsystems to selectively communicate with one another, based at least on part on said configuration states tracked.

28. The integrated circuit of claim 27, wherein said routing resource configurator of said data traffic router further notifies a source one of said first, second and third subsystems whenever it is unable to configure a corresponding one of said multiplexors to provide a path for an output of said source one of said first, second and third subsystems to reach the output's destination.

29. The integrated circuit of claim 28, wherein said routing resource configurator of said data traffic router is equipped to notify said source one of said first, second and third subsystems to retry at a later point in time.

30. The integrated circuit of claim 26, wherein said configurator of said data traffic router is further equipped to provide said multiplexors with appropriate configuration signals to configure said multiplexors.

31. The integrated circuit of claim 21, wherein said integrated circuit further comprises a fourth plurality of subsystems, including said first subsystem, and an on-chip bus coupling said fourth plurality of subsystems, including first subsystem, to one of said multiplexors.

32. The integrated circuit of claim 31, wherein each of said fourth plurality of subsystems is a selected one of a security engine, a voice processor, a collection of peripheral device controllers, a framer processor, and a network media access controller.

33. The integrated circuit of claim 21, wherein said second subsystem is a selected ones of a processor and a memory controller.

34. In an integrated circuit (IC), a method of operation comprising:

a first subsystem of the IC outputting a first output for a selected one of a second and a third subsystem of the IC;

the second subsystem outputting a second output for a selected of said first and third subsystem;

the third subsystem outputting a third output for a selected of said first and second subsystems; and

a data traffic router selectively configuring itself to provide paths for all or a subset of said first, second and third outputs to concurrently reach the outputs' destinations.

35. The method of claim 34, wherein said selective configuring by said data traffic router comprises

said data traffic router selectively configuring a first multiplexor of said data traffic router, coupled to said subsystems, to select and output for said third subsystem one of said first output of said first subsystem and said second output of said second subsystem;

said data traffic router selectively configuring a second multiplexor of said data traffic router, coupled to said subsystems, to select and output for said second subsystem one of said first output of said first subsystem and said third output of said third subsystem; and

said data traffic router selectively configuring a third multiplexor of said data traffic router, coupled to said subsystems, to select and output for said first subsystem one of said second output of said second subsystem and said third output of said third subsystem.

36. The method of claim 35 wherein said selective configuring further comprises said data traffic router selectively configuring said first multiplexor to select and output for said third subsystem, said third output of said third subsystem in lieu of selecting one of said first and second outputs of said first and second subsystems, to facilitate a first and a second device attached to said third subsystem in communicating with one another, said first multiplexor being also coupled to receive the third output of said third subsystem.

37. The method of claim 35, wherein

said first, second and third outputting of said first, second and third subsystems are also selectively output for a fourth subsystem at time;

the method further comprises the fourth subsystem selectively outputting a fourth output for one of said first, second and third subsystem; and

said data traffic router also selectively configure itself to provide a path for said fourth output to reach its destination.

38. The method of claim 34, wherein said selective configuring by said data traffic router comprises selectively configuring multiplexors of said data traffic router responsive to destinations of outputs of said subsystems.

39. The method of claim 38, wherein said selective configuring by said data traffic router further comprises said data traffic router storing and tracking configuration

states of a plurality of multiplexors, and said data traffic router selectively configuring iteseIf, based at least on part on said configuration states tracked.

40. The method of claim 39, wherein said selective configuring by said data traffic router further comprises said data traffic router notifying a source one of said first, second and third subsystems whenever it is unable to configure itself to provide a path for an output of said source one of said first, second and third subsystems to reach the output's destination.

41. The method of claim 40, wherein said data traffic router performing said notification by notifying said source one of said first, second and third subsystems to retry at a later point in time.

42. The method of claim 38, wherein said selective configuring by said data traffic router further comprises said data traffic router providing multiplexors of said data traffic router with appropriate configuration signals to configure said multiplexors.